

# DETERMINATION OF HEAVY METALS IN FISH SAMPLES FROM TRABZON COAST OF THE EASTERN BLACK SEA

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## Abstract

In the present study, concentration of heavy metals (Cu, Cd, Fe, Mn, Pb, Zn) were determined in the two different demersal (benthic) fish species of red mullet (*Mullus barbatus ponticus*) and whiting (*Merlangius merlangus euxinus*). Samples were collected from the two stations in the Black Sea. One of the stations is Sürmene Bay and the other is Yomra Bay in Trabzon-Türkiye. The concentrations of metals (Cu, Cd and Pb) were determined by using GFAAS, Zn, Fe, and Mn by using FAAS.

**Keywords:** *Black Sea, Demersal, Bio-Accumulation*

## Introduction

The pollution of the aquatic environment with heavy metals has become a worldwide problem during recent years, because they are indestructible and most of them have toxic effects on organisms [1]. The eastern Turkish Black Sea coast is not an industrialized area, and the agricultural activities are greater in the eastern region than along the western Black Sea coast. Such activities involve, the application of pesticides and artificial fertilizers in widely diversified habitat, including agricultural croplands, and hazelnut and tea plantations [2]. Different aquatic organisms often respond to external contamination in different ways, where the quantity and form of the element in water, sediment, or food will determine the degree of accumulation. Contaminants in the sediment are taken up by benthic organisms in a process called bioaccumulation. When larger animals feed on these contaminated organisms, the toxins are taken into their bodies, moving up the food chain in increasing concentrations in a process known as biomagnifications. As a result, fish and shellfish, waterfowl, and freshwater and marine mammals may accumulate hazardous concentrations of toxic chemicals [3].

3 - Begum, A., S. H., Khan, I., 2009. Analysis of Heavy Metals in Waters, Sediments and Fish Samples of Madivala Lakes of Bangalore, Karnataka. *International Journal of Chemtech Research*. pp: 245- 249.

4 - Milestone Digestion Application Note DG- FO- 17.

## Material and Method

The size of the fish collected varied in November 2009, depending on the species, between 11 cm and 22 cm, and their age was from 4 to 1.5 cm years. The separated fish were put in petri dishes to dry at 105 °C until reaching a constant weight. Dried fish were placed into digestion flasks and ultra pure concentration HNO<sub>3</sub> and H<sub>2</sub>O<sub>2</sub> (7:1 v/v) was added. The digestion flasks were heated to 200 °C until dissolution. The temperature control microwave heating device was used for digestion of the dried fish meat for determination the metals with spectroscopic methods. After dissolution diluted with water and analyzed for heavy metal concentration using atomic absorption spectrometer [4].

## Results and Discussion

Heavy metal concentrations determined in the fish samples same length groups from the two different regions. Cu, Cd, Fe, Mn, Pb, Zn analyses results are given in Table 1. Region differences are observed Fe and Mn in the first group whiting and Zn in the third group whiting. Cd concentrations are differences all off group whittings and Pb concentration in the first and second group whittings are considered significant. Except Pb, all metal concentrations in the red mullet samples from Sürmene and Yomra Bay are not determined differences (p>0.05).

Tab. 1. Heavy metal concentrations (µg/g dry wt) in whiting and red mullet samples

Fish	Station	Total Length (cm)	Total Weight (g)	Fe (mg/L)	Mn (mg/L)	Zn (mg/L)	Cu (µg/L)	Cd (µg/L)	Pb (µg/L)
Whiting 1	Sürmene	20.94±0.82	74.19±9.21	11.19±0.80	0.94±0.12	15.78±0.45	384±34	49.47±3.49	10.26±0.67
	Yomra	19.60±1.29	64.79±1.19	7.48±0.79	0.20±0.07	16.33±0.50	432±78	11.87±0.89	6.27±0.16
Whiting 2	Sürmene	15.42±0.34	27.49±2.07	6.15±1.17	0.69±0.23	15.46±0.39	539±33	64.13±0.84	11.61±2.90
	Yomra	14.93±0.67	24.83±3.65	9.06±1.53	0.86±0.19	15.82±0.51	542±63	23.52±0.81	4.56±1.06
Whiting 3	Sürmene	13.70±0.89	17.65±2.47	13.71±2.06	0.79±0.14	16.99±0.67	510±42	77.82±0.97	11.79±3.83
	Yomra	12.50±0.61	13.05±1.46	10.04±2.47	1.19±0.18	15.04±0.53	552±32	68.64±2.94	4.24±3.04
Red mullet	Sürmene	12.67±0.71	20.20±3.50	19.80±1.50	1.09±0.23	15.54±2.02	506±6	33.54±1.86	4.52±0.28
	Yomra	11.43±0.35	15.39±1.41	23.22±1.60	1.18±0.44	17.47±0.28	626±8	29.59±1.28	2.78±0.61

## References

- 1 - MacFerlane, G. B., Burchett, M. D., 2000. Cellular Distribution of Cu, Pb and Zn in the Grey Mangrove *Avicennia Marina* (Forsk). *Vierch Aquatic Botanic*, 68: 45- 59.
- 2 - Ergül, H. A., Topcuoglu, s., Ölmez, E., Kirbasoglu, Ç., 2008. Heavy Metals in Sinking Particles and Bottom Sediments from Eastern Turkish Coast of the Black Sea. *Estuarine, Coastal and Shelf Science*: 1-7.